1 151. The device according to claim 120 wherein at least one imaging lens is arranged between the pinhole aperture and the detector device.

1 152. The device according to claim 120 wherein at least one semitransparent mirror is arranged between the pinhole aperture and the detector device.

1 153. The device according to claim 120 wherein at least one reflecting mirror is arranged between the pinhole aperture and the detector device.

154. The device according to claim ~~120~~ 119, further comprising

e) an additional laser beam generation device for generating an additional laser beam with a wavelength different from the first wavelength,

f) an additional focusing device for focusing said additional laser beam onto the measuring volume wherein the additional laser beam is such highly focused within the measuring volume that in essence it exclusively covers the measuring volume,

g) an additional detector device for detecting fluorescence radiation generated due to excitation of one or more molecules, molecular complexes or molecular fragments, and

h) a correlator unit which is connected with the two detector devices.

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155. The device according to claim 154, further comprising

i) a T-shaped support with a first supporting arm and a second supporting arm connected therewith and running perpendicular to the first supporting arm,

j) two holding devices arranged at the ends at the faces of the second supporting arm for axial guiding and holding of optical elements ~~(lens, filter, mirror, detector)~~ for the two laser beams and the two fluorescence radiations wherein the focused laser beams impinge on a glass slide bearing the measuring volume and being separably arranged between the two ends at the faces of the second supporting arm and held by them, wherein the two holding devices can be moved synchronously relative to their respective ends at the faces of the second supporting arm in a direction of a longitudinal extension thereof, the two holding devices are extended in a direction of extension of the first supporting arm, and the two laser beams can be deflected by deflecting mirrors through optical openings out of an inside of the first supporting arm onto the optical elements for the laser beams held at the holding devices.

156. The device according to claim 154, further comprising

i) a T-shaped support with a first supporting arm and a second supporting arm connected therewith and running perpendicular to the first supporting arm,

j) two holding devices arranged at the ends at the faces of the second supporting arm for axial guiding and holding of optical elements ~~(lens, filter, mirror, detector)~~ for the two laser beams and the two fluorescence radiations wherein the focused laser beams impinge on a glass slide bearing the measuring volume and being separably arranged between the two ends at the faces of the second supporting arm and held by them,



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wherein the two holding devices can be moved synchronously relative to their respective ends at the faces of the second supporting arm in a direction of a longitudinal extension thereof, the two holding devices are extended in a direction of extension of the first supporting arm, and the two laser beams can be deflected by semitransparent mirrors through optical openings out of an inside of the first supporting arm onto the optical elements for the laser beams held at the holding devices.

157. The device according to claim ~~136~~ 154 wherein the focused laser beams are being separably arranged halfway between the two ends at the faces of the second supporting arm.

158. The device according to claim ~~136~~ 154 wherein the optical elements for the laser beams are arranged at the inner sides, facing each other, of the two holding devices and the optical elements for the fluorescence radiation are arranged at the outer sides, facing away from each other, of the two holding devices.

159. The device according to claim ~~136~~ 154 wherein one of the focusing objective lenses can be positioned by an adjusting element for compensation of an offset of the focuses of said focusing objective lenses.

160. The device according to claim 159 wherein the adjusting element is piezoelectrically driven.

161. The device according to claim 119 wherein the observation unit has photon counting appliances, a correlation appliance, and a multichannel scaler appliance.

162. The device according to claim 161 comprising computer assisted means for processing or evaluating the measuring signal ~~in a computer assisted way~~.



**APPENDIX** (iii)



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163. The device according to claim 126 wherein the appliances for prefocusing are provided with a lens and an array corresponding to microscope optics wherein a ~~colonnaded~~ collimated laser beam is focused on the image plane $B_1$ by a lens and on the image plane $B_2$ (first image) by said array.

164. The device according to claim 163 wherein said array is provided with an exchangeable arrangement of lenses for the variation of the diameter of the prefocused laser beam.

165. The device according to claim 119 wherein a detection unit is constituted by two detectors with a beam splitter partitioning the light emitted from the sample to the detectors.

166. The device according to claim 165 wherein the emitted light beam passes imaging lenses and filter elements prior to each of the detectors.

167. The device according to claim 165 wherein the detectors detect light of different wavelengths.

168. The device according to claim ~~119~~ 120 wherein one or more detector elements are placed in the image plane in the form of a detector array.

169. The device according to claim 119 comprising two objectives which form an angle of >90° between them.

170. The device according to claim 119 wherein the laser beam generation device comprise a continuous laser~~s~~ emitting light of wavelengths > 200 nm ~~are used~~.

171. The device according to claim 170 wherein the laser is a argon, krypton, helium-neon, or helium-cadmium laser~~s~~ ~~are used~~.







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uses beam generatin device comprises a

172. The device according to claim 119 wherein laser pulsed with high frequency of ≥ 20 MHz with a power of ≥ 0.5 mW ~~are used~~.

173. The device according to claim 119 wherein appliances for single photon counting are arranged in the beam path of emitted light for detecting the emitted light wherein signal analysis is performed by a digital correlator or multichannel correlator.

174. The device according to claim 173 wherein said appliances for single photon counting are avalanche diode detectors.

175. The device according to claim 173 wherein said appliances for single photon counting are arranged in the plane of the pinhole aperture.

176. The device according to claim 119 wherein the measuring volume is situated in a sample volume between two capillaries, said capillaries being provided with a chemically inert conductive coating at the outer side, and wherein the conductive coatings are connected via a computer controlled rectified field or an alternating field and are conductively connected with each other through the measuring volume.

177. The device according to claim 176 wherein the coating is a metal vapor deposited coating.

178. The device according to claim 177 wherein the coating is a gold vapor deposited coating on a chromium priming.

179. The device according to claim 119 wherein two microscope optics facing each other enclose the measuring volume.







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180. The device according to claim 119, further comprising an electrophoretic device with at least one electrophoresis cell having at least one opening for charging/discharging of a sample to be analyzed into the measuring volume or of a washing solution, a wall electrode, a ring electrode, a Neher capillary, an electrode at the tip of the capillary and a droplet outlet.

181. The device according to claim 180 comprising an electric trap having a quadrupole element with at least four electrodes.

182. The device according to claim 181 the quadrupole element includes pin electrodes or vapor-deposited electrodes in a water configuration wherein a hole of < 1mm is lined.

183. The device according to claim 181 further comprising at least two additional electrodes in at least a sextupole arrangement ..

184. The device according to claim 183 wherein the quadrupole element is provided with alternating voltage and a direct voltage is applied to the sextupole electrodes such that the polarity thereof is opposed to the charge of the molecules to be analyzed.

185. The device according to claim 180 ~~characterized in that~~ further comprising a sheet for receiving samples ~~is used~~, said sheet having specific binding properties for molecules due to molecular derivatization.

186. The device according to claim 185 wherein the molecular derivatization includes ion-exchange ligands or affinity ligands.

187. The device according to claim 186 wherein said ligands are oligopeptides, polypeptides, proteins, antibodies or chelating agents, especially iminodiacetic acid or nitriloacetic acid ligands.







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188. The device according to claim 185, ~~characterized in that~~ comprising sheets ~~are used~~ having different molecular structures of different binding specificity as ligands in specific positions. X

189. The device according to claim 180 wherein the sample ~~volume~~ comprising one or more molecules, molecular complexes & molecular fragments to be detect is fixed on a sample receiving device which is two-or three-dimensionally controllable.

190. The device according to claim 189 wherein the sample receiving device ~~can be fixed in defined space coordinates with respect to the measuring optics by using~~ comprises two- or three-dimensional piezo drives to fix the sample in defined space coordinates. X

191. The device according to claim 180 wherein said device is equipped with an appliance which deflects the laser beam in defined coordinates.

192. The device according to claim 180 wherein said device is equipped with an appliance which can definitely determine the positioning of focusing.

193. The device according to claim 119 ~~comprising~~ wherein the detector device comprises a multiarray detector. X

194. The device according to claim 119 comprising an optical system for the parallel illumination of several ~~excitation~~ measuring volumes. X

195. The device according to claim ~~154~~ 243 wherein the focused laser beams are being separably arranged halfway between the two ends at the faces of the second supporting arm. X

196. The device according to claim ~~154~~ 243 wherein the optical elements for the laser beams are arranged at the inner sides, facing each other, of the two holding devices and the optical elements for the fluorescence radiation are arranged at the outer sides, facing away from each other, of the two holding devices. X





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197. The device according to claim 184 wherein one of the focusing objective lenses can be positioned by an adjusting element for compensation of an offset of the focuses of said focusing objective lenses.

198. The device according to claim 197 wherein the adjusting element is piezoelectrically driven.

199. The device according to claim 120 wherein the observation unit has photon counting appliances, a correlation appliance, and a multichannel scaler appliance.

200. The device according to claim 199 comprising computer assisted means for processing or evaluating the measuring signal ~~in a computer assisted way~~.

201. The device according to claim 144 wherein the appliances for prefocusing are provided with a lens and an array corresponding to microscope optics wherein a ~~colomaded~~ collimated laser beam is focused on the image plane $B_1$ by a lens and on the image plane $B_2$ (first image) by said array.

202. The device according to claim 201 wherein said array is provided with an exchangeable arrangement of lenses for the variation of the diameter of the prefocused laser beam.

203. The device according to claim 120 wherein a detection unit is constituted by two detectors with a beam splitter partitioning the light emitted from the sample to the detectors.

204. The device according to claim 203 wherein the emitted light beam passes imaging lenses and filter elements prior to each of the detectors.

205. The device according to claim 203 wherein the detectors detect light of different wavelengths.





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~~206. The device according to claim 120 wherein one or more detector elements are placed in the image plane in the form of a detector array.~~

207. The device according to claim 120 comprising two objectives which form an angle of > 90° between them.

the laser beam generation device comprises a

208. The device according to claim 120 wherein continuous ~~lasers~~ laser emitting light of wavelengths > 200 nm ~~are used.~~ X

the laser is a

209. The device according to claim 208 wherein argon, krypton, helium-neon, or helium-cadmium ~~lasers are used~~ laser X

the laser beam generation device comprises a

210. The device according to claim 120 wherein ~~lasers~~ laser pulsed with high frequency of ≥ 20 MHz with a power of ≥ 0.5 mW ~~are used~~. X

211. The device according to claim 120 wherein appliances for single photon counting are arranged in the beam path of emitted light for detecting the emitted light wherein signal analysis is performed by a digital correlator or multichannel correlator.

212. The device according to claim 211 wherein said appliances for single photon counting are avalanche diode detectors.

213. The device according to claim 211 wherein said appliances for single photon counting are arranged in the plane of the pinhole aperture.

214. The device according to claim 120 wherein the measuring volume is situated in a sample volume between two capillaries, said capillaries being provided with a chemically inert conductive coating at the outer side, and wherein the conductive coatings are connected via





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a computer controlled rectified field or an alternating field and are conductively connected with each other through the measuring volume.

215. The device according to claim 214 wherein the coating is a metal vapor deposited coating.

216. The device according to claim 215 wherein the coating is a gold vapor deposited coating on a chromium priming.

217. The device according to claim 120 wherein two microscope optics facing each other enclose the measuring volume.

218. The device according to claim 120, further comprising an electrophoretic device with at least one electrophoresis cell having at least one opening for charging/discharging of a sample to be analyzed into the measuring volume or of a washing solution, a wall electrode, a ring electrode, a Neher capillary, an electrode at the tip of the capillary and a droplet outlet.

219. The device according to claim 218 comprising an electric trap having a quadrupole element with at least four electrodes.

220. The device according to claim 219 the quadrupole element includes pin electrodes or vapor-deposited electrodes in a water configuration wherein a hole of < 1mm is lined.

221. The device according to claim 219 further comprising at least two additional electrodes in at least a sextupole arrangement .

222. The device according to claim 221 wherein the quadrupole element is provided with alternating voltage and a direct voltage is applied to the sextupole electrodes such that the polarity thereof is opposed to the charge of the molecules to be analyzed.





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223. The device according to claim 218 ~~characterized in that~~ further comprising a sheet for receiving samples ~~is used~~ having specific binding properties for molecules due to molecular derivatization.

224. The device according to claim 223 wherein the molecular derivatization includes ion-exchange ligands or affinity ligands.

225. The device according to claim 224 wherein said ligands are oligopeptides, polypeptides, proteins, antibodies or chelating agents, especially iminodiacetic acid or nitriloacetic acid ligands.

226. The device according to claim 223 ~~characterized in that~~ comprising sheets ~~are used~~ having different molecular structures of different binding specificity as ligands in specific positions.

227. The device according to claim 218 wherein the sample ~~volume~~ comprising one or more molecules, molecule complexes or molecular fragments to be detected is fixed on a sample receiving device which is two-or three-dimensionally controllable.

228. The device according to claim 227 wherein the sample ~~can be fixed in defined space coordinates with respect to the measuring optics by using~~ comprises two- or three-dimensional piezo drives. to fix the sample in defined space coordinates.

229. The device according to claim 218 wherein said device is equipped with an appliance which deflects the laser beam in defined coordinates.

230. The device according to claim 218 wherein said device is equipped with an appliance which can definitely determine the positioning of focusing.

231. The device according to claim 120 ~~comprising~~ wherein the detector device comprises a multiarray detector.





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232. The device according to claim 120 comprising an optical system for the parallel illumination of several ~~excitation~~ measuring volumes.

~~233. The device according to claim 137 wherein the focused laser beams are being separably arranged halfway between the two ends at the faces of the second supporting arm.~~

~~234. The device according to claim 137 wherein the optical elements for the laser beams are arranged at the inner sides, facing each other, of the two holding devices and the optical elements for the fluorescence radiation are arranged at the outer sides, facing away from each other, of the two holding devices.~~

~~235. The device according to claim 137 wherein one of the focusing objective lenses can be positioned by an adjusting element for compensation of an offset of the focuses of said focusing objective lenses.~~

~~236. The device according to claim 235 wherein the adjusting element is piezoelectrically driven.~~

~~237. The device according to claim 155 wherein the focused laser beams are being separably arranged halfway between the two ends at the faces of the second supporting arm.~~

~~238. The device according to claim 155 wherein the optical elements for the laser beams are arranged at the inner sides, facing each other, of the two holding devices and the optical elements for the fluorescence radiation are arranged at the outer sides, facing away from each other, of the two holding devices.~~





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